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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/598,763

01/10/2007

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EXAMINER

HAWKINS, KARLA

ART UNIT

PAPER NUMBER

1797

NOTIFICATION DATE

DELIVERY MODE

04/02/2009

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

gbpatent@gbpatent.com  
pto@gbpatent.com

<b>Office Action Summary</b>	<b>Application No.</b> 10/598,763	<b>Applicant(s)</b> NISHI ET AL.	
	<b>Examiner</b> KARLA HAWKINS	<b>Art Unit</b> 1797	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 March 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-32 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 11 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>01/10/07</u> .  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. This is the initial Office action for application 10/598,763.
2. Claims 1-32 are pending.

#### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for

determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
  2. Ascertaining the differences between the prior art and the claims at issue.
  3. Resolving the level of ordinary skill in the pertinent art.
  4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claim(s) 1-14, 16-21, 23-25, 27-30 are rejected under 35 USC 103 (a) as being obvious over **SHIMOMURA (JP 2001-129345)** in view of **SZIRMAY (US 4,529,415)** and **HASHIMOTO (US 2002/0015669 A1)**.
1. Regarding claims 1-3, 6-7, 8, 12, 13, 14, 21, and 25, **SHIMOMURA** discloses an activated carbon adsorbing column 1, a plurality of cartridges 5 are placed on a container main body 4, a gas inlet 2 and a discharge chamber 9 having gas outlet 3 (abs.); a part of odor which passes the opening 21 for gas branching here advances into the gas stream entrance into a room 29,

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adsorption treatment of the odor component is carried out, passing through the active carbon layer 26 (paragraph 20, figure 1).

2. **SHIMOMURA** does not appear to explicitly disclose a rectification part for rectifying gas passing through said solid absorbent.
3. However, **SZIRMAY** discloses a rectifying gas or agent is introduced into the feed end of the adsorber, gaseous products withdrawn from the adsorber until the most absorbable gaseous product appears in the effluent from the adsorber in a desired significant quantity whereupon flow of the rectifying agent is discontinued (col. 3, lines 3-9).

\* **SHIMOMURA** and **SZIRMAY** are analogous art because they are from the *same field of endeavor* of gas separation via adsorption.

4. At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the column of **SHIMOMURA** to include the rectification of **SZIRMAY**.
5. The motivation would have been to provide a relatively inexpensive method and apparatus for use in separating specific gases from a feed mixture of gases and separating a specific gas, and also to provide rectifying effect by using a desired bottom product as rectifying agent (col. 2, lines 9-16).
6. Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.

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7. Further regarding claims 1, 812, 13, 14, 21, and 25 the combination of **SHIMOMURA SZIRMAY** does not appear to explicitly disclose adsorbing nitrogen oxide and a regeneration step.
8. However, **HASHIMOTO** discloses an exhaust emission control system that can accurately estimate the amount of sulfur oxide absorbed in the nitrogen oxide removing device to thereby execute the regeneration process for the device at the optimum timing (paragraph 6).
- \* The combination of **SHIMOMURA SZIRMAY** and **HASHIMOTO** are analogous art because they are from the *same field of endeavor* of gas separation via adsorption.
9. **SZIRMAY** teaches readying means of each adsorber are respectively arranged with corresponding means of the remaining adsorbers to utilize common headers or supplying means (col. 3, lines 27-30). At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the combination of **SHIMOMURA SZIRMAY** to include the readying means (regeneration) of **HASHIMOTO**.
10. The motivation would have been so that the estimation of the amount of sulfur oxide absorbed in the nitrogen oxide (NO<sub>x</sub>) removing device becomes inaccurate. This causes a problem in that the timing of execution of the regeneration process may deviate from the optimum timing (**HASHIMOTO**, paragraph 5).

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11. Therefore, the invention as a whole would have been *prima facie* obvious to one of ordinary skill in the art at the time the invention was made.
12. Regarding claims 4-5, **SHIMOMURA** discloses an activated carbon adsorbing column 1, a plurality of cartridges 5 are placed on a container main body 4, a gas inlet 2 and a discharge chamber 9 having gas outlet 3 (abs. and figure 1). **SHIMOMURA** does not disclose the exact ratio and angle of claims 4 and 5, but it would be considered mere design choice of the apparatus.
13. Regarding claim 9 the combination of **SHIMOMURA** and **SZIRMAY** discloses the claimed invention except the water- tightness of the storage and rectification part. It would have been obvious to one having ordinary skill in the art at the time of the invention to increase the tightness of the apparatus, since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).
14. Regarding claim 8, 10, 16, 23, 27-28, **HASHIMOTO** discloses an exhaust emission control system that can accurately estimate the amount of sulfur oxide absorbed in the *nitrogen oxide removing device* to thereby execute the *regeneration process* for the device at the optimum timing (paragraph 6) .
15. Regarding claims 11, 19, 24, and 30, **HASHIMOTO** teaches the use of a sulfur oxide as the adsorbent used (abs.). **HASHIMOTO** discloses the claimed invention except for the use of specific sulfur containing nitrogen oxide adsorbents. It would have been obvious for one skilled in the art at the time of

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the invention was made to use a more preferable sulfur containing adsorbent, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as a matter of obvious design choice. *In re Leshin*, 125 USPQ 416.

16. Regarding claims 15 and 22, **HASHIMOTO** discloses the use of an intake pressure sensor 8, intake air temperature sensor 9 (paragraph 27), a detection signal from the oil pressure sensor is supplied (paragraph 37); and a speed sensor 31 (paragraph 38). It would have been an obvious variant for one skilled in the art at the time of the invention to incorporate a nitrogen oxide sensor within this system.

17. Regarding claims 17 and 29, combination of **SHIMOMURA**, **SZIRMAY**, and **HASHIMOTO** does not specifically teach the preprocessing step of turning nitrogen oxide contained in the gas into nitrogen dioxide, dinitrogen trioxide, etc. It would have been obvious for one skilled in the art at the time of the invention was made to use a more preferable sulfur containing adsorbent, since it has been held that omission of an element and its function in a combination where the remaining element perform the same functions as before involves only routine skill in the art. *In re Karlson*, 136 USPQ 184.

18. Regarding claim 18, **HASHIMOTO** teaches exhaust emission control system for an internal combustion engine (abs.). I would be obvious to use air in any outdoor area such as a tunnel, canal, shelter, parking area, road, or bus stop.

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19. Regarding claim 20, the combination of **SHIMOMURA**, **SZIRMAY**, and **HASHIMOTO** discloses the claimed invention except a regeneration reducing substance. It would have been obvious for one having ordinary skill in the art at the time of the invention was made to regeneration reducing substance, since it has been held that omission of an element and its function in a combination where the remaining elements perform the same functions as before involves only routine skill in the art. *In re Karlson*, 136 USPQ 184.
20. Regarding claim 22, **HASHIMOTO** teaches the use of an exhaust emission control system (abs.).
21. Claim(s) 31-32 are rejected under 35 USC 103 (a) as being obvious over the combination of **SHIMOMURA (JP 2001-129345)**, **SZIRMAY (US 4,529,415)**, **HASHIMOTO (US 2002/0015669 A1)** in view of **LOVELL ET AL. (US 6,477,854 B2)**.
22. Regarding claims 30 and 31, the combination of **SHIMOMURA**, **SZIRMAY**, and **HASHIMOTO** discloses a nitrogen oxide removal equipment using adsorption with a rectification means, and a regeneration step.
23. The combination does not seem to expressly disclose the use of humidifying means integrated with adsorption means.
24. **LOVELL** discloses nitrogen oxides as a test gas and a water chamber to humidify the test gas (col. 26, lines 37-43).
- \* **The combination** and **LOVELL** are analogous art because they are from the *same field of endeavor* of gas separation via adsorption.



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25. At the time of the invention, it would have been obvious to one of ordinary skill in the art to modify the method and apparatus of **the combination** to include the humidifying means of **LOVELL**.

26. The motivation would have been to provide compositions, processes and systems for removal of heavy metals from gas streams, especially those resulting from the combustion of coal which contain the precursors of acid gases such as NO<sub>x</sub> (col. 8, lines 53-63).

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KARLA HAWKINS whose telephone number is (571) 270-5562. The examiner can normally be reached on Monday-Thursday 7:30- 5, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Jason M. Greene/  
Primary Examiner, Art Unit 1797

Karla Hawkins  
Examiner  
Art Unit 1797